WE CLAIM:

1. An actuator mechanism for movement along a support membrane structure, said actuator mechanism comprising:

a ferromagnetic plug with a first coefficient of thermal expansion and a first coefficient of friction, said ferromagnetic plug being positioned on a surface of said support membrane structure and magnetically coupled to said support membrane structure;

a center band with a third coefficient of friction, said center band being positioned on the surface of said support membrane structure and fixedly attached to said ferromagnetic plug, said center band encircling said ferromagnetic plug;

an actuator material region with a second coefficient of thermal expansion, said actuator material region being positioned above the surface of said support membrane structure and adjacent to said center band, said actuator material region being separated from said ferromagnetic plug by said center band; and

an outer band with a second coefficient of friction fixedly attached to said actuator material region, said outer band being positioned on the surface of said support membrane structure and adjacent to said actuator material region and said outer band being magnetically coupled to said support membrane structure.

2. The mechanism of claim 1 wherein:

said support membrane structure is diamagnetic;

said ferromagnetic plug is coupled to said support membrane structure by magnetic attraction of said ferromagnetic plug to a first magnetic region through said diamagnetic support membrane structure; and

said outer band is coupled to said support membrane structure by magnetic attraction of said outer band to a second magnetic region through said

diamagnetic support membrane structure; and

said ferromagnetic plug is thermally expandable to lift said center band off the surface of said support membrane structure.

3. The mechanism of claim 1 wherein said actuator material region includes a plurality of slots extending radially outward from around said ferromagnetic plug.

4. The mechanism of claim 1 wherein a portion of said actuator material region is capable of expanding towards a center of said ferromagnetic plug in a direction parallel to the surface of said support membrane structure.

5. The mechanism of claim 1 wherein said actuator material region includes a plurality of segments, said plurality of segments formed by a plurality of slots.

6. The mechanism of claim 5 wherein each segment in the plurality of segments is capable of expanding towards a center of said ferromagnetic plug in a direction parallel to the surface of said support membrane structure.

7. The mechanism as claimed in claim 1 wherein the first coefficient of friction is less then the second coefficient of friction and the second coefficient of friction is less then the third coefficient of friction.

8. The mechanism as claimed in claim 1 wherein said actuator material region encircles said ferromagnetic plug.

9. An actuator mechanism for movement along a diamagnetic support membrane structure, said actuator mechanism comprising:

a ferromagnetic plug with a first coefficient of thermal expansion and a first coefficient of friction, said ferromagnetic plug being positioned on a surface of said support membrane structure, said ferromagnetic plug being capable of expanding in a direction perpendicular to the surface of said support membrane structure;

a center band with a third coefficient of friction, said center band being positioned on the surface of said support membrane structure and fixedly attached to said ferromagnetic plug, said center band encircling said ferromagnetic plug;

an actuator material region with a second coefficient of thermal expansion, said actuator material region being positioned above the surface of said support membrane structure and around said ferromagnetic plug, said actuator material region being capable of expanding in a direction parallel to the surface of said support membrane structure;

an outer band with a second coefficient of friction, said outer band being positioned on the side of said support membrane structure and encircling said actuator material region;

a first magnetic region positioned on the opposed surface of said support membrane structure and adjacent to said ferromagnetic plug; and

a second magnetic region positioned on the opposed surface of said support membrane structure and adjacent to said outer band.

10. The mechanism of claim 9 wherein said actuator material region is separated from said center band.

11. The mechanism of claim 9 wherein said actuator material region includes a plurality of slots diverging radially outwardly from a center of said ferromagnetic plug.

12. The mechanism of claim 9 further including a reflective target positioned on a center of said ferromagnetic plug.

13. The mechanism of claim 9 further including an adjustment beam magnetically coupled with said first magnetic region.

14. The mechanism of claim 13 further including at least one of an optical reflector and an antenna structure attached to said adjustment beam.

15. The mechanism of claim 9 further including at least one conductive terminal electrically connected to at least one of said ferromagnetic plug and said actuator material region.

16. The mechanism as claimed in claim 9 further including at least one light source capable of directing a beam of light onto at least one of said ferromagnetic plug and said actuator material region.

17. A mechanical system comprising:

a support membrane structure that is diamagnetic;

an actuator mechanism positioned on a surface of said support membrane structure, said actuator mechanism including

a ferromagnetic plug with a first coefficient of thermal expansion and a first coefficient of friction, said ferromagnetic plug being positioned on a surface of said support membrane structure, said ferromagnetic plug being capable of expanding in a direction perpendicular to the surface of said support membrane structure;

a first band with a third coefficient of friction, said first band being positioned on the side of said support membrane structure and fixedly attached to said ferromagnetic plug, said first band encircling said ferromagnetic

plug;

an actuator material region with a second coefficient of thermal expansion, said actuator material region being positioned on the surface of said support membrane structure and around said first band, said actuator material region being capable of expanding in a direction parallel to the surface of said support membrane structure;

a second band with a second coefficient of friction, said second band being positioned on the surface of said support membrane structure and around said actuator material region, said second band being fixedly attached to said actuator material;

a first magnetic region positioned on an opposed surface of said support membrane structure and magnetically coupled to said ferromagnetic plug; and

a second magnetic region positioned on the opposed surface of said support membrane structure and magnetically coupled to said second band;

an adjustment beam magnetically coupled to said first magnetic region;

a frame structure connected to said adjustment beam;

a reflector segment attached to said adjustment beam; and

at least one heat source capable of heating at least one of said ferromagnetic plug and said actuator material region.

18. The system of claim 17 wherein said reflector segment includes a mirror.

19. The system of claim 17 wherein said reflector segment has one of a circular shape and a hexagonal shape.

20. The system of claim 17 wherein said at least one heat source includes one of a light source and a current source.

21. A reflector system comprising:

a support membrane structure with an actuator mechanism;

an adjustment beam with an end, the end of said adjustment beam being attached to the actuator mechanism;

a frame structure attached to an opposed end of said adjustment beam; and

a reflector segment attached to said adjustment beam.

22. The system of claim 21 including a plurality of reflector segments.

23. The system of claim 21 wherein said reflector segment is an optical reflector.

24. The system of claim 21 wherein said reflector segment is a radio wave reflector.

25. The system of claim 21 wherein said support membrane structure is diamagnetic and said actuator mechanism includes:

a ferromagnetic plug with a first coefficient of thermal expansion and a first coefficient of friction, said ferromagnetic plug being positioned on a surface of said support membrane structure, said ferromagnetic plug being capable of expanding in a direction perpendicular to the surface of said support membrane structure;

a first band with a third coefficient of friction, said first band being positioned on the side of said support membrane structure and fixedly attached to said ferromagnetic plug, said first band encircling said ferromagnetic plug;

an actuator material region with a second coefficient of thermal expansion, said actuator material region being positioned on the surface of said support membrane structure and around said first band, said actuator material region being capable of expanding in a direction parallel to the surface of said support membrane structure;

a second band with a second coefficient of friction, said second band being positioned on the surface of said support membrane structure and around said actuator material region, said second band being fixedly attached to said actuator material;

a first magnetic region positioned on an opposed surface of said support membrane structure and magnetically coupled to said ferromagnetic plug; and

a second magnetic region positioned on the opposed surface of said support membrane structure and magnetically coupled to said second band.

26. A method of moving an actuator mechanism along a support membrane structure, said method comprising the steps of:

increasing a first temperature of a ferromagnetic plug wherein said ferromagnetic plug expands in a direction perpendicular to a surface of said support membrane structure lifting a center band off the surface of said support membrane structure;

increasing a second temperature of an actuator material region at a first position wherein said actuator material region expands at the first position in a direction parallel to the surface of said support membrane structure moving said ferromagnetic plug and said center band in a direction parallel to the surface of said support membrane structure;

decreasing the first temperature so that said ferromagnetic plug contracts and said center band frictionally engages the surface of said support membrane structure;

decreasing the second temperature; and

increasing a third temperature of said actuator material at a second position wherein said actuator material region expands at the second position in a direction parallel to the surface of said support membrane structure.

27. The method as claimed in claim 26 further including a step of decreasing the third temperature.

28. The method as claimed in claim 26 wherein said step of increasing the first temperature includes a step of directing a laser light source onto said ferromagnetic plug.

29. The method as claimed in claim 26 wherein said step of increasing the second temperature includes a step of directing a laser light source onto the first position of said actuator material region.

30. The method as claimed in claim 26 wherein said step of increasing the third temperature includes a step of directing a laser light source onto the second position of said actuator material region.

31. The method as claimed in claim 26 wherein said step increasing the first temperature includes a step of flowing an electric current through said ferromagnetic plug.

32. The method as claimed in claim 26 wherein said step of increasing the second temperature includes a step of flowing an electric current through the first position of said actuator region.

33. The method as claimed in claim 26 wherein said step of increasing the third temperature includes a step of flowing an electric current through the second position of said actuator region.

34. The method as claimed in claim 26 wherein said step of increasing the third temperature includes a step of choosing the second position so that the outer band becomes centered about a center of said ferromagnetic plug.

35. The method as claimed in claim 26 wherein said step increasing the third temperature includes a step of choosing the second position to be 180° from the first position.

36. A method of moving a reflector system relative to a support membrane structure, said method comprising the steps of:

directing a first beam of energy onto a ferromagnetic plug magnetically coupled to a reflector segment, the first beam of energy causing a first temperature in said ferromagnetic plug to increase wherein said ferromagnetic plug expands in a direction perpendicular to a surface of said support membrane structure, lifting a center band encircling said ferromagnetic plug off the surface of said support membrane structure;

directing a second beam of energy onto an actuator material region encircling said center band, the second beam of energy causing a second temperature in said actuator material region to increase at a first position wherein said actuator material region expands in a direction parallel to the surface of said support membrane structure, moving said ferromagnetic plug, center band, and said reflector segment in a direction parallel to the surface of said support membrane structure;

turning off said first beam of energy causing the second

temperature to decrease so that said center band frictionally engages the surface of said support membrane structure;

turning off said second beam of energy causing the second temperature to decrease; and

directing at least one of the first and second beams of energy onto said actuator material region at a second position causing said outer band to move in a direction parallel to the surface of said support membrane structure to become centered about a center of said ferromagnetic plug.

37. The method as claimed in claim 36 wherein said step of directing at least one of said first and second beams of energy onto said actuator material region includes a step of turning on a laser.

38. The method as claimed in claim 36 wherein said step of directing said first beam of energy includes a step of directing said first beam of energy at a reflector target positioned on the center of said ferromagnetic plug.

39. The method as claimed in claim 36 wherein said step of directing said second beam of energy onto said actuator material at the first position includes a step of expanding said actuator material region at the first position in a direction towards the center of said ferromagnetic plug.

40. The method as claimed in claim 36 wherein said step of directing said at least one said first and second beam of energy onto said actuator material at the second position includes a step of expanding said actuator material region at the second position in a direction away from the center of said ferromagnetic plug.

41. The method as claimed in claim 36 wherein said step of heating said actuator material region at said first position includes a step of increasing the second temperature of said actuator material region at said first position to be greater than a temperature of said actuator material at said second position.

42. The method as claimed in claim 36 wherein said step of heating said actuator material region at said second position includes a step of increasing a third temperature of said actuator material region at said second region to be greater than the second temperature of said actuator material at said first position.